The president's address, read in his absence by Dr. A. W. Ward, of Peterhouse, contained references to the importance of recent discoveries regarding the early Mediterranean civilisations, and laid stress on the value of modern critical ethnology for the correct understanding of the foundations of present-day movements in Europe; while Mr. D. G. Hogarth's paper on Hittites and the Hittite civilisation showed that a beginning has been made in attacking an outstanding problem bearing on the same subject. Prof. E. Bernheim spoke of history as a record of the variation of intellectual viewpoint at different epochs of time. Prof. von Gierke dealt with the evolution of the idea of the right of a numerical majority to control the government of a country. Prof. Pirenne gave a suggestive account of the stages in the growth of capitalism from the twelfth to the nineteenth centuries, and described the change from mere subsistence industry and husbandry to the creation of capitalism as an engine by which the advancing intelligence can obtain an increase in knowledge, in material resources, and in control over the forces of nature.

In the subsection devoted to the exact sciences, natural history, and medicine, papers were read by Sir Clifford Allbutt on Palissy, Bacon and the revival of natural science; by Prof. Loria on mathematics in Great Britain; by Prof. Silvanus Thompson on the history of the compass card; by Prof. H. H. Turner on Aristarchus of Samos, and by Mr. Rouse Ball on Newton's Principia and also on magic; Dr. Norman Moore gave an account of the Royal College of Physicians, Prof. L. C. Miall illustrated seventeenth-century research by the life of Peiresc, and Mr. W. C. D. Whetham read a paper on the historical method in natural science.

PUBLIC VETERINARY SERVICES.

A DEPARTMENTAL Committee on the Public Veterinary Services was appointed last August by Mr. Runciman to inquire into the requirements of the public services with regard to the employment of officers possessing veterinary qualifications, and to consider whether any further measures can with advantage be adopted for the selection and training of students with a view to such employment. The committee, the report of which has recently been published (Cd. 6575), consisted of Sir A. Hopkinson (chairman), Sir T. H. Elliott, Sir T. W. Holderness, Mr. H. J. Read, and Major G. F. MacMunn. In October Sir T. W. Holderness resigned, and Mr. F. C. Drake succeeded him.

In all twenty-one witnesses were examined, together with a number of written statements of representatives of self-governing Dominions and universities who for various reasons were unable to attend in person. Evidence was given on behalf of the Departments employing veterinary officers, viz., the Colonial Office, India Office, War Office, and the Board of Agriculture and Fisheries; also on behalf of the five veterinary colleges, the examining and diploma-granting body (the Royal College of Veterinary Surgeons), and various British universities.

After considering the present system of veterinary education, the committee is of opinion that the standard appears sufficient for the purposes of private practice, but not for the public services, for research and administrative work. The army veterinary department has no difficulty in finding suitable candidates, and, moreover, the first two years of the young officer's service are devoted to the improvement of his education, and to training him for his future work.

The demand for the other public services of veterinary officers has increased, and will almost certainly increase still further. Already great difficulty has been encountered in procuring suitably trained men for the posts, alike at home, in the Colonies, and in India. The most important steps to be taken to improve the quality and quantity of candidates are (1) to encourage a larger number of young men who have continued their general and scientific education beyond secondary-school age to enter the veterinary profession; (2) to provide for men who have qualified as veterinary surgeons increased facilities to extend their knowledge, more especially in the direction of specialisation in one branch of veterinary science; and (3) to improve the system of notifying vacancies.

With these objects in view the committee recommends that: Students possessing a suitable science degree should be exempted from one of the four years at present required for veterinary qualifications; that twelve scholarships should be offered each year of the annual value of 80*l.* each, tenable at a veterinary college for three years, with a view to encourage a number of men who have received a good scientific education to enter the veterinary profession; scholarships of an annual value of not less than 100*l.* and not exceeding 150*l.* should be offered each year to enable qualified veterinary surgeons to undertake advanced study and laboratory work at suitable institutions at home or abroad, where special facilities for such studies exist. The committee further recommends that increased State aid should be given to institutions devoted to veterinary education, the efficiency of which is of great importance to the State. It is of opinion that the Royal College of Veterinary Surgeons "is performing a work of great national importance, and that its efforts to maintain a high standard of veterinary education in this country are worthy of every encouragement."

NOTES.

THE International Congress of Zoology at Monaco and that of Geography at Rome are over, but another interesting meeting of representatives of the nations took place on April 5, at the Zoological Station, Naples. The occasion was the unveiling of a memorial tablet to the illustrious founder of the station, Prof. Anton Dohrn. The tablet, in bronze, which has been fixed above the fountain on the north side of the central court between the two great laboratories, was unveiled by Prof. von Graff, who spoke on behalf of the International Zoological Congress, at the meeting of which at Graz it was decided to erect and place within the station a monument to the late Anton Dohrn. Von Graff, in his appreciation of Dohrn's work, referred more especially to the international character which the station has developed under the distinguished direction of its founder. The tablet having been unveiled, Prof. Todaro, of Rome, an old personal friend of Dohrn's, spoke on behalf of the Accademia dei Lincei and the Italian Department of Public Education. Dr. Wever, Consul-General for Germany in Naples, made a speech representing the Foreign Office and the Department of Public Education in Berlin. Marchese del Carretto, Mayor of Naples, spoke of the advantages enjoyed by the town from the aquarium and marine station, and Admiral Raggio Ducarne referred to the connection between the Italian Navy and the zoological station. Wreaths were placed at the base of the monument by the speakers mentioned, and by many of the delegates. After a speech by Prof. Reinhard Dohrn, son of the late Anton Dohrn, and now director of the station, the ceremony concluded.

We regret to see the announcement of the death, on April 14, of Herr Karl Hagenbeck, the owner of the famous zoological park at Stellingen.

The death is announced, at forty-eight years of age, of Mr. Percival Spencer, the well-known balloon manufacturer and aëronaut, who made many notable journeys by balloon, and was closely associated with developments of aërial navigation.

At the annual general meeting of the Selborne Society, to be held in the theatre of the Civil Service Commission, Burlington Gardens, W., on Monday next, April 21, there will be an exhibition by Mr. John Glen of the portrait recently discovered which claims to be that of Gilbert White.

The death is announced of Prof. V. Dwelshauvers-Dery, correspondant of the Paris Academy of Sciences, in the section of mechanics, and of M. Louis Henry, correspondant in the section of chemistry. Prof. Dwelshauvers-Dery was born at Dinant in 1836, and studied engineering at Brussels and Liège, obtaining his degree as doctor of physical sciences at the latter place in 1861, where he afterwards took charge of the course of applied mechanics, and established a laboratory. He gave particular attention to the study of steam engines.

Sir Edward T. Candy, formerly judge of the Bombay High Court, whose death at Great Shelford, near Cambridge, on April 13, in his sixty-eighth year, is announced, took an active share in the work of the Bombay University, and was Vice-Chancellor for five years (1897–1902). He was chairman of the provisional committee of the Indian Research Institute now established at Bangalore through the munificence of the late Mr. J. N. Tata. On his retirement in 1903 he settled at Great Shelford, and he took a keen interest in the affairs of Cambridge University.

A pioneer in telegraph engineering has been lost by the death, at the age of eighty-two, of Mr. E. B. Bright, on April 14. From an obituary notice in the Engineering Supplement of *The Times* we learn that with his young brother, afterwards Sir Charles Bright, he joined the Electric Telegraph Company in 1847. Within a year of entering this new field both became inventors. Perhaps the most important of their early inventions was the system, devised in February, 1849, of testing insulated conductors to localise faults from a distant point, by means of a series of standard resistance coils of different values, brought into circuit successively by turning a connecting handle. In 1851 Charles left the Electric Company, and shortly afterwards became engineer to the British Telegraph Company, while Edward joined the Magnetic Telegraph Company, of which, in 1852, when only twenty-one years old, he became manager. The brothers soon found it necessary to devise fresh apparatus to compensate for the inductive discharge resulting from the long underground circuits by discharging to earth and thus neutralising the recoil currents. From that time until the spring of 1854 they carried out a series of experiments on the great lengths of subterranean wires under their control in order to investigate this novel phenomenon. Edward Bright was largely responsible for the establishment of telegraphic communication between the West Indian Islands by some 5000 miles of submarine cable. He was a member of the Institution of Civil Engineers and a member of council of the Institution of Electrical Engineers.

The Royal College of Surgeons has awarded the triennial prize, with which is given the John Hunter medal, to Dr. W. Blair Bell, of Liverpool, for his dissertation on the anatomy and physiology of the pituitary body. The subject of the prize for the next period is "The Human and Comparative Anatomy and Physiology of the Cerebellum." The Jacksonian prize for the year 1912 has been awarded to Mr. F. W. Goyder, of Bradford, Yorks, for his dissertation on the embryology and treatment of cleft palate. The subject of the prize for the year 1914 is "The Pathology, Diagnosis, and Treatment of Trigeminal Neuralgia."

A joint session of the Aristotelian Society, the British Psychological Society, and the Mind Association will be held in London on June 7 and 8. In the afternoon of June 7 there will be a symposium, "Are Intensity Differences of Sensation Quantitative?" to which Messrs. C. S. Myers, Dawes Hicks, H. J. Watt, and Wm. Brown will contribute. In the evening there will be a discussion of a paper by Dr. Arthur Robinson on memory. The subject of a symposium on June 8 will be, "Can There be Anything Obscure or Implicit in a Mental State?" and Messrs. Henry Barker, G. F. Stout, and R. F. A. Hoernle will take part.

Whatever may be the subsequent effect, if any, of the removal of the Royal Geographical Society from its old centrally situated premises in Savile Row to the "West End," there can be no question as to the enhanced convenience and amenities afforded by the new home at Kensington Gore, which the Society opened on Monday last, after an enforced sojourn in temporary quarters at Cromwell Gardens since the beginning of the year. The house, formerly known as Lowther Lodge, has proved excellently adaptable to its new purpose. The ground floor provides a museum and lounge, in addition to two map-rooms and a council-room—a change indeed from the conditions at Savile Row. The accommodation on the first floor serves for the library, for various rooms for the convenience of fellows, and for offices; on the second floor is the surveying school, with students' and draughtsmen's rooms, while the roof provides space for an observatory for the purposes of the school. The intention is to dispose of a considerable portion of the land attached to the house, but sufficient will be retained to form a pleasant open space on the south side of the building.

THREE evening lectures (the Chadwick Public Lectures, 1913) on the evolution of epidemics are being given by Dr. J. T. C. Nash, at the Royal Society of Medicine, 1 Wimpole Street, W. In his first lecture Dr. Nash pointed out that, although measles is so constantly with us, and smallpox is generally so distinctive, and is yet common enough in various parts of the world, no causal germ has yet been definitely recognised for either disease. Certain other specific diseases have been found to be due to the life-processes within the blood and tissues of higher forms of life than mere bacteria. Malaria is an example of such. In pre-vaccination days smallpox in Great Britain showed a periodic intensity of prevalence every three, four, or five years, but during the latter half of the nineteenth century, since vaccination was made compulsory in 1851, only one widespread epidemic occurred, in 1871–72, when smallpox overran Europe and America; but it must be remembered that vaccination was not the only measure in force, and compulsory notification, disinfection, isolation, "following up" of contacts throughout the incubation of the disease, all assisted in limiting the spread of infection and widening out the inter-epidemic periods. In commenting upon the second Chadwick Lecture, delivered on Monday last, Sir Richard Douglas Powell, who presided, said that Dr. Nash's arguments were of great importance in leading to a salutary speculation on the true character and possible removability of endemic, as well as epidemic diseases. May it not be that the bovine, avian, and human forms of tubercular diseases are distinct only from the fact that for many generations the micro-organisms have been cultivated in the special environments of beasts, birds, and mankind, and that the root-ancestor of all was a fungus dwelling in the earth and ever ready to spread into animal soil? Dr. Nash's lectures should do much to lead students of the etiology of tuberculosis to look back into long-forgotten factors, such as that of soil, which were discussed by Buchanan and other men of medicine in his (Sir Douglas Powell's) early years. The next lecture will be given on Monday next, April 21, when Sir William J. Collins will preside.

IN June Dr. F. W. Mott, F.R.S., will give a course of Chadwick Public Lectures at the Royal Society of Arts, under the title of "Nature and Nurture in Mental Development." Among the lectures in contemplation for the provincial cities are those on the public milk supply—some criticisms and suggestions from the public health point of view, by Prof. Henry R. Kenwood, at Cardiff; on water supply, with exhaustive consideration of sources, collecting works, conveyance, and distribution, by Mr. E. P. Hill, at Birmingham; and on infant welfare, by Prof. Karl Pearson, F.R.S., at the School of Economics, May 16, 23, and 30. Glasgow, Bristol, and other cities of the kingdom will also be provided with Chadwick Public Lectures during the year. All the lectures will be free and open to the public, but will be of a character to attract post-graduate and advanced students of engineering, medicine, and other cognate sciences. The secretary to the trust, to whom all communications should be addressed, is Mrs. Aubrey Richardson, 8 Dartmouth Street, Westminster.

THE Eugenics Record Office, which was established at Cold Spring Harbor, Long Island, in October, 1910, by Mrs. E. H. Harriman, with the additional assistance of Mr. John D. Rockefeller and others, has recently entered upon a new stage of its development. A board of scientific directors has been organised, comprising Dr. Alexander Graham Bell, chairman; Dr. William H. Welch, professor of pathology, Johns Hopkins Hospital, vice-chairman; Prof. Irving Fisher, Yale University; Prof. Lewellys Barker, of Johns Hopkins Hospital; Prof. E. E. Southard, of Harvard University, and director of the Psychopathic Hospital, Boston; and Dr. C. B. Davenport, secretary of the board and resident director. The board met at Cold Spring Harbor on March 21, and organised its work. The aim of the Eugenics Record Office was defined to be as follows:—(1) To promote researches in eugenics that shall be of utility to the human race. This part of the programme includes the study of America's most effective blood lines and the methods of securing the preponderance and relative increase of the best strains; the study of the origin of and the best methods of restricting the strains that produce the defective and delinquent classes of the community; the study of the method of inheritance of particular traits; the study of the consequences of the marriages of close kin; the study of miscegenation in the United States; the study, both in that country and abroad, of the family histories of permanent immigrants. (2) To publish the results of these researches. (3) To provide a fireproof building for the preservation of eugenical records, including genealogical works and town histories. (4) To provide an administrative office and staff to carry out the work.

IN the third part of his useful periodical, *Visvakarma*, Mr. Ananda K. Coomaraswamy gives a further selection of examples of Indian sculpture. The present instalment is devoted to specimens from Java, Cambodia, and Ceylon, all of which betray Hindu influence, while two fine examples from Sarnáth, near Benares, and from Nepal are excellent illustrations of the local art. The photographs are now more artistically reproduced than in the first number of the series, and the collection will be of interest to artists and students of the religions of the East.

We recently deplored the lack of encouragement and support received by the Royal Anthopological Institute of Great Britain and Ireland from the State and the public of this country. When we turn to America the case is very different. From the forty-sixth report of the Peabody Museum of American Archæology and Ethnology, connected with the Harvard University, we learn that steps are being taken to complete the museum buildings according to the original plans prepared fifty-three years ago by Louis Agassiz. The plans provide for the addition of five exhibition halls, each 100 by 60 ft., a stack-room for the library, several workrooms and offices, a photographic room, a lift, and other conveniences. These important extensions are needed to supply accommodation for the vast collections of material which are being collected by parties of explorers at work in all parts of the country, under the guidance of the museum authorities, and the large donations presented to the institution by members of the public.

In *Man* for April Mr. T. C. Hodson discusses the question of seasonal marriages in India. During last February the Kadva Kanbis of Gujarat celebrated, after an interval of some ten years, the weddings of all the marriageable youths and girls in the tribe. A similar custom prevails among a group of the Madras Chettis, and among some Karens in Burma it is only when an official visits their country and orders a wedding to take place that the ceremony is performed. This custom may be an extension of the human pairing season which has been discussed by Prof. Westermarck. At present, among the Kanbis, it seems to be the result of a system of hypergamy—the desire to marry a girl in a grade higher than her own—which results in a scarcity of bridegrooms and increase of the bridegroom price. But it may have originated in some belief connected with astrology, or some tribal custom the cause of which is now obscure.

The Journal of Genetics for February (vol. ii., No. 4) contains three papers, two of which are more of the nature of general reviews and discussions than records of original observation. Dr. A. H. Trow discusses "Forms of Reduplication"—the phenomena more generally known as gametic coupling and repulsion. He points out that if there are factors A, B, C, in which there is coupling between A and B and between A and C, then there will of necessity be secondary coupling between B and C. He works out formulæ for the "secondary reduplication" and compares them with actual cases already recorded. Mr. Clifford Dobell reviews the present knowledge of mutation in bacteria, devoting the greater part of his paper to physiological mutations, *i.e.* inherited changes in the power of producing ferments or pigments. He shows that such mutations have been frequently described, that many of them are apparently spontaneous, but that in some cases at least they are due to change of environment, and that in this case they are not rarely adaptive. Mr. K. Toyama gives a detailed account of the inheritance of egg-characters in the silkworm (*Bombyx mori*). There are a number of definite characters (shape, colour, &c.) in various breeds, and his most important result is that the majority of these characters, even when they depend upon the embryo and not upon the shell, are determined by the constitution of the female parent, and not by that of the embryo. For example, a female of a breed having eggs with the recessive character, mated with a male of a breed having eggs with the dominant character, produces eggs of the recessive character, but the females reared from these eggs, however mated, lay eggs with the dominant character.

"Dominancy in Nature" is the title of the presidential address (of which we have been favoured with a copy) delivered by Mr. J. W. Taylor at the annual meeting of the Yorkshire Naturalists' Union, held on December 14, 1912. The author holds the view that western and central Europe was the birthplace, or dispersal centre, of nearly all groups of animals.

In an account of the manner in which bees collect pollen, published as Bulletin No. 121 of the Entomological Bureau of the U.S. Department of Agriculture, the author, Dr. D. B. Casteel, states that the articles published by Mr. F. W. L. Sladen in 1911, 1912 (one of which appeared in our own columns, February 29, 1912, p. 586), afforded the first true explanation of the function, and that his own observations have confirmed the accuracy of Mr. Sladen's work. "Pollen," he writes, "may be collected by the worker upon its mouth-parts, upon the brushes of its legs, and upon the hairy surface of its body. When the bee collects from small flowers, or when the supply is not abundant, the mouth-parts are chiefly instrumental in obtaining the pollen. The specialised leg-brushes of the worker are used to assemble the pollen, collecting it from the body-parts, to which it first adheres, and transporting it to the pollen-baskets, or corbiculæ, of the hind-legs. In this manipulation the fore-legs gather pollen from the mouth-parts and head; the middle-legs from the fore-legs and from the thorax; the hind-legs from the middle-legs and from the abdomen. . . . A little pollen is loaded directly from the middle-legs into the baskets when these legs are used to put down the pollen-masses."

In the March number of *The American Naturalist* Prof. Kellogg, of Stanford University, reviews the results of his laborious investigations into the geographical and "host" distribution of the external parasitic insects commonly known as bird-lice (Mallophaga). Despite their popular name, nearly 100 out of the 1500 known species are parasitic on mammals, although none of those infesting mammals visits birds, or *vice versâ*. Indeed, with a few exceptions in a couple of genera, the mammal-infesting species belong to families distinct from those parasitic on birds; the members of the former group, in adaptation to a life spent among fur instead of feathers, having discarded one of the two terminal claws of the limbs. After referring to the fact that the various species of these parasites are to a great extent restricted to particular species or groups of kindred species of hosts, the author directs attention to the remarkable fact that certain kinds of these lice are to be found on hosts completely sundered from one another by geographical barriers. The European and the American avocets have, for example, two species in common, while the Old World and New World bitterns have one. To explain this the author suggests that the parasitic species has been handed down practically unchanged to its present hosts from their common ancestor, and consequently that the species of bird-lice are much older than the birds they infest.

In a report on wheat experiments in the United Provinces (Bull. 32, 1912, Agricultural Research Institute, Pusa), Mr. H. Martin Leake and Ram Prasad direct attention to the high yields often obtained. Whereas the average outturn of grain per acre for the Fatehpur area is given as 1250 lb. for irrigated, and 600 lb. for non-irrigated land, yields of 1700 to 2000 lb. were often obtained in these experiments, whilst a yield of 2200 to 2400 lb. may be expected under favourable conditions. These relatively high returns are not attributable to the use of manures or to rich soil, but are probably due to the adoption of hot-weather cultivation. Actual experiments show the value of this practice and indicate it to be cumulative in effect.

An interesting account of experiments on the utilisation of pasteurised milk for Cheddar cheese-making has been published by Messrs. J. L. Sammis and A. T. Bruhn (Research Bulletin 27, Univ. Wisconsin Agric. Exp. Stat.). In practice, the processes of cheese-making have been subject to daily variation on account of qualitative and quantitative differences in the initial bacterial flora of the milk, and the resulting product has varied accordingly. The above investigators have now devised a method by means of which these initial differences are eliminated. The milk is first pasteurised at 160° to 165° F., whereby about 99 per cent. of the bacteria are killed; the reaction of the milk is then corrected, by the addition of hydrochloric acid, to 0·25 per cent. acidity (stated as lactic acid); a pure culture of lactic acid bacteria is added, and all subsequent processes can be carried out according to a time schedule. It is also claimed that the quality of the product is more uniform than that of cheese produced by the ordinary method; the cheese may be safely stored at high temperatures; the losses of fat are lower, and the average yield is higher than under ordinary conditions. In addition to providing a means of destroying pathogenic organisms contained in the milk, the method may prove of value in connection with research on the processes of cheese-ripening.

An article by Mr. N. Mori, on the formation of "tree-frost" in northern Japan, appears in the February issue of the Journal of the Meteorological Society of Japan. The author distinguishes this from hoar-frost, which is formed at or about freezing-point, observing that "tree-frost"—which appears on various objects, but principally upon the branches of trees—follows on early morning mist and a temperature of from 10° to 30° below freezing-point. In appearance "tree-frost" is quite different from hoar-frost, resembling white blooms. The author regards the phenomenon as due to the direct freezing on to the tree-branches of the minute watery particles of mist formed at a temperature below freezing-point. Mr. R. Hirano, of the Tadotsu Meteorological Station, has an article on *shigure,* or drizzling rain, in which he seeks to draw scientific deductions from references to the subject in Japanese poetry ranging over a period of more than a thousand years. Among other matters of interest is an account, by Baron Yoshida, of a cloud pillar observed in Kaga province, on the Japan Sea coast, on the afternoon of December 25, 1912. Snow had been falling and covered the ground to a depth of 4 or 5 in., but had ceased, and the sky was clear, with the exception of some cumulo-stratus clouds. Among them a curious ash-white cloud made its appearance, and from this suddenly was seen to rise a whirling column, which moved off in a northerly direction. A smaller column was formed in its rear and followed it at an equal distance. Both columns vanished in about eight minutes, the smaller being the first to disappear.

In the issue of Nature for July 28, 1910 (vol. lxxxiv., p. 118), attention was directed to the method of treating storage cells seriously reduced in capacity by sulphating, which had been used with great success by Mr. J. O. Hamilton, of the Kansas State College. At a recent meeting of the American Electrochemical Society, Messrs. C. W. Bennett and D. S. Cole, of the electrical engineering department of Cornell University, described the results of applying a similar method to the college battery of fifty-two cells, which, owing to sulphating, had a capacity of only 30 instead of its rated capacity of 60 ampere hours. The acid was removed from the cells and replaced by a 10 per cent. solution of pure sodium sulphate. The battery was then charged for 53 hours, and the plates removed, washed, and replaced in their proper acid. The capacity was found to be increased to 58 ampere hours, and the total cost of the treatment worked out at 10*d.* per cell. An abstract of Messrs. Bennett and Cole's communication will be found in *The Electrician* for March 28.

The Journal of the Franklin Institute for March contains an article by Mr. H. T. Herr, of the Westinghouse Machine Company, on recent developments in steam turbines. This article gives an excellent account, with drawings, of the present turbine practice of the Westinghouse Company. The author states that scarcely any turbine of anybody's make ever gave trouble due to blades breaking or coming out because of centrifugal force. Breakages are accounted for by vibrations, and until lashing of the longer blades was resorted to, breaking was caused by individual vibration. The lashing, or shrouding, must not be continuous, as provision for unequal expansion due to heating must be taken account of; hence, all lashed blades must be arranged in segments not exceeding 2 ft. for large diameters. These segments may vibrate as a whole, but the lashing has the effect of increasing the frequency and diminishing the amplitude of the vibrations. Lashing or shrouding is therefore a palliative against vibration, and not a cure. It is the practice of the Westinghouse firm to lash all reaction blades above 1 in. in length, and very long blades may have three or four rows of lashing wire.

As is well known, air in excess of that which is required to ensure complete combustion of the fuel under a boiler carries away heat wastefully to the chimney, and the boiler and its flues are less efficient in absorbing the heat which has been produced. Engineers, therefore, test flue gases for carbonic acid, as an unduly small proportion of this corresponds to unnecessary excess of air. This is generally done by ascertaining the reduction in volume of the flue gas after treatment with a solution of caustic soda. These wet chemical methods, of course, work well enough, but the lower-grade type of engineer does not take kindly to them. The Underfeed Stoker Co., Ltd., of Coventry House, South Place, E.C., however, has put on the market, at a cost of five guineas, an extremely neat pocket apparatus, called the CO_2 thermoscope, in which no liquids are used. A measured charge of the gas is passed through a charge of powdered caustic soda contained in a copper cap looking like a detonator, but sealed at both ends. The ends are first pricked and then the cartridge is placed within the hollow bulb of a mercurial thermometer contained within the instrument. The zero of a sliding scale is then set to the mercury index and the piston of the instrument is pushed home so as to drive the gas through the cartridge of caustic soda. This heats up the cartridge, and the thermometer, acting as a calorimeter, shows directly on the scale the proportion of CO_2 present. Provision is made for eliminating the effect of temperature on the volume of the gas taken. As in the wet process, SO_2 counts as CO_2, but in this case in a higher degree in consequence of the greater heat of combination.

OUR ASTRONOMICAL COLUMN.

The Question of Radium in the Chromosphere.—Bulletin No. 27 of the Kodaikanal Observatory contains an important statement by Mr. Evershed regarding the recent communications concerning the presence of radium and the elements of the inactive group in the chromosphere. One of the recent communications concerned a comparison made by Mr. Dyson of the lines of radium and the emanation with the bright lines in the chromospheric spectrum as observed at eclipses; this comparison indicated many apparent coincidences of wave-length, and he suggested that these elements may be revealed by their emission lines, although not by their absorption lines, as is the case of helium. In the first part of the paper Evershed deals with the comparison of the chromospheric lines with those of radium and the emanation. He employs for the chromosphere the spectra he obtained during the eclipse of 1900 for the ultra-violet region of the spectrum and the spectra (glass positives from the original) secured by Dr. Mitchell at the eclipse of 1905; these latter are, as he states, "the finest that have ever been obtained in the less refrangible region." In the second portion he devotes his inquiry to the question of the presence of neon or argon in the chromosphere, using the wave-lengths of the chromospheric lines as obtained by himself, Lockyer, and Dyson, and discusses the spectra thoroughly.

The result of his inquiry, to use his own words, is to show "that with the best eclipse material now available and the most recent measurements of the lines of the elements in question, the evidence is of a distinctly negative character as regards radium and the emanation, as well as neon and argon, and the probability is that not one of these elements can be recognised in the sun by a study of the emission spectrum of the chromosphere any more than by a comparison with the solar absorption spectrum." He further states that he has also examined the spectra of krypton and zenon, and also finds no evidence for their presence in the chromosphere.

Dedication of the New Allegheny Observatory.—The corner-stone of the new buildings for this observatory was laid by Mr. John A. Brashear on October 20, 1900. The director at that time was Prof. F. L. O. Wadsworth. The work of building and transference has been completed, and the observatory dedicated with religious solemnity and handed over to the trustees of the University of Pittsburgh. We have lately received (Misc. Sci. Papers, Alleg. Obs., N.S., vol. ii., No. 2) an account of the dedicatory exercises and presentation which took place on August 18 of last year, and were referred to in Nature of September 19, 1912 (vol. xc., p. 89). It is a pity that such stimulating scenes do not mark the history of astronomy in England. The various speeches are given in full, and in an appendix is given the speech made when the corner-stone was laid. Happily, Mr. John Brashear, to whose personal endeavours the new observatory owes so much, has lived to see crowned the works he then put in progress.

General Index to the Memoirs of the Society of Italian Spectroscopists.—The fortieth anniversary of the above society and the completion of forty volumes (1872–1911) of the memoirs have been celebrated in a manner "modesta ed utile" by the preparation and publication of an *Indice Generale delle Memorie.* The index is made "per Autori e per Materia." The latter part is not an alphabetical list of titles juggled on the change-ringing system adopted in some catalogues, but consists of a number of natural divisions of the subject forming heads of lists of papers arranged chronologically under author's names. Prof. A. Ricco is responsible for the grouping. Other members of the staff of the Astrophysical Observatory of Catania have assisted.

NATIONAL ASPECTS OF EDUCATION.

SEVERAL notable utterances relating to our national scheme of education have recently been made by Lord Haldane and other members of the Government. Apparently the intention of the Government is to introduce a measure which will organise our educational institutions and forces on a national basis, and in the spirit worthy of a great modern State. Among the developments adumbrated are the raising of the leaving age of compulsory attendance at primary schools, the abolition of the "half-time" system, compulsory attendance at continuation schools, the correlation of primary and secondary schools, improvement of the status of teachers, increased number of provincial universities and of facilities for entering them.

The development of national education along such lines as these signifies a substantial increase of expenditure; and as the contributions from rates for educational purposes have reached breaking-point in